



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 02/26/02  
  
Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 02/14/02

RCRA RECORDS CENTER  
FACILITY Pratt & Whitney-Main St  
I.D. NO. CTD990672081  
FILE LOC. R-12  
OTHER RDMS # 1088

A Tier II data validation was performed on data for six soil samples collected on February 14, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. A trip blank and performance samples were included with the sample delivery group. The samples discussed in this validation memorandum were analyzed for VOCs by SW846 Method 8260B, SVOCs by SW846 Method 8270C, TPH by USEPA 418.1, Metals by SW846 Method 6010B and Cyanide by SW846 Method 9012. These parameters are herein referred to as the "other parameters." Validation for the samples submitted for PCBs by SW846 Method 8082 are presented in a separate validation report.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT103. The internal laboratory lot number associated with this sample delivery group is E202511.

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Organic Data Review (December 1996), Pesticides / PCBs Data Review (July 1988) and Inorganic Data Review (February 1989) as appropriate. Chemistry parameters were validated using the same logic as presented in Region 1, EPA validation guidelines for other parameters where applicable. Since there is no official guidance at this time for

validating general chemistry analyses. Technical judgement was applied when applicable and necessary.

The following tables have been included in this report: Table I: Summary of Tier II Data Assessment, Table II Samples associated with the sample delivery group (SDG), Table III: Summary of Data Validation Qualifiers applied to samples as a result of the validation, and Table IV: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table II of this report.

## **ORGANIC DATA REVIEW**

Organic data review includes review of analyses for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs).

## **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- |                                      |   |
|--------------------------------------|---|
| ▪ Performance Evaluation Sample Data | ▪ Surrogate Compounds                   |
| ▪ Agreement with Chain-of-Custody    | ▪ Internal Standards                    |
| ▪ Preservation and Holding Time      | ▪ Matrix Spike / Matrix Spike Duplicate |
| ▪ GC/MS Instrument Performance Check | ▪ Laboratory Control Sample             |

- Initial and Continuing Calibration
- Practical Quantitation Limits
- Blanks
- Tentatively Identified compounds

## **DISCUSSION**

### **Agreement of Analyses with Chain of Custody**

*Sample reports are checked to verify that the reported results corresponded to analytical requests as detailed on the chain-of-custody record. The chain-of-custody form is reviewed for accuracy and completeness.*

Samples were relinquished to Premier Laboratory, LLC under chain-of-custody on February 14, 2002. The laboratory received the samples on February 14, 2002. During validation, the chain-of-custody form was reviewed for accuracy and completeness. No discrepancies were noted..

## **VOLATILE ORGANIC ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

Nineteen VOCs were spiked into the sample. All the PE data were within vendor-certified acceptance limits.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The sample cooler temperatures recorded by the laboratory were 6.0 °C and 8.0°C.

The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice and in addition, all VOC soil samples were preserved on site in methanol according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

### **GC/MS Instrument Performance Check**

*Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.*

All ion abundance acceptance criteria specified in the methods for VOCs were met for each 12-hour period that samples were analyzed.

### **Initial and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

All VOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

A trip blank (2001888) all method blanks were evaluated for contamination for VOCs.

No detects were reported.

### **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for VOCs.

### **Internal Standards**

*Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.*

All VOC data for the QC acceptance criteria were met for internal standard (IS) area counts and retention times.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

The laboratory performed a VOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001876. The following table summarizes data, which did not meet QC acceptance criteria:

Compound	%Rec MS	%Rec MSD	QC limits	RPD	Positive detects	NDs	Bias	Affected Samples
Chloroethane	56		60-142		J	J	Low	2001876

All affected data were qualified accordingly.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All data met the QC acceptance criteria for percent recovery for the VOC laboratory control sample(s).

### **Field Duplicate**

A field duplicate pair was not submitted with this data set.

### **Tentatively Identified Compounds**

No tentatively identified compounds were reported.

## **SEMIVOLATILE ORGANIC ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

Forty SVOCs were spiked into the sample. All the PE data were within vendor-certified acceptance limits.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The sample cooler temperatures recorded by the laboratory were 6.0 °C and 8.0°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

### **GC/MS Instrument Performance Check**

*Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.*

All ion abundance acceptance criteria specified in the methods SVOCs were met for each 12-hour period that samples were analyzed.

### **Initial and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

All SVOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations.



## **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

All method blanks were evaluated for contamination for SVOCs. No detects were reported.

## **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for SVOCs.

## **Internal Standards**

*Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.*

All SVOC data for the QC acceptance criteria were met for internal standard (IS) area counts and retention times.

## **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

The laboratory performed an SVOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001876. The following table summarizes data, which did not meet QC acceptance criteria:

Compound	%Rec MS	%Rec MSD	QC limits	RPD	RPD limits	Positive detects	NDs	Bias	Affected Samples
Di-n-butyl phthalate				22.7	21	J	J	None	2001876
1,2-Dichlorobenzene				48.6	36	J	J	None	2001876
1,3-Dichlorobenzene				50.7	38	J	J	None	2001876
1,4-Dichlorobenzene				50.1	45	J	J	None	2001876
Hexachlorocyclopentadiene				51.9	41	J	J	None	2001876
Hexachloroethane				53.4	38	J	J	None	2001876

All affected data were qualified accordingly.

### Laboratory Control Sample

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All data met the QC acceptance criteria for percent recovery for the SVOC laboratory control sample(s).

### Field Duplicate

A field duplicate pair was not submitted with this data set.

## **Tentatively Identified Compounds**

No tentatively identified compounds were reported.

## **INORGANIC DATA REVIEW**

### **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- Performance Evaluation Data
- Agreement with Chain of Custody
- Preservation and Technical Holding Times
- Calibration Verification
- Blanks
- ICP Interference Check Sample
- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Furnace AA / Post Digestion Spike
- Laboratory Control Sample
- Serial Dilution Results
- Detection Limit Results

## **DISCUSSION**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

Eleven metals were spiked into the sample. All the PE data were within vendor-certified acceptance limits.

## **Preservation and Holding Times**

All samples were properly preserved and analyzed within method-specified holding times.

## **Calibration Verification**

*Compliance requirements are evaluated to ensure that the instrument is capable of producing acceptable quantitative data.*

All initial calibration verification (ICV) and continuing calibration verification (CCV) for all metals were analyzed at the appropriate frequency and were within control limits

## **Lab Fortified Blanks**

*Blank analyses were assessed to determine the existence and magnitude of contamination problems.*

All analytes were within acceptance limit for percent recovery for the lab fortified blank analyses.

## **Matrix Spike / Matrix Spike Duplicate**

*The matrix spike sample was evaluated to provide information about the effect of the sample matrix on the digestion and measurement methodology.*

A MS/MSD was performed on sample 2001876. All analytes were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses.

## **Laboratory Duplicates**

All analytes were within acceptance limits for Relative Percent Difference for the laboratory duplicate analyses. Criteria for acceptable duplicate precision is less than 35% RPD for sample results that are greater than five times the CRDL and  $\pm 2X$  CRDL for sample results that are less than the five times the CRDL.

## **Field Duplicates**

*Field duplicates were assessed to determine overall precision (i.e. field and laboratory precision).*

A field duplicate pair was not submitted with this data set.

## **Laboratory Control Sample**

*The laboratory control sample is evaluated to assess the efficiency of the digestion procedure.*

All data met the QC acceptance criteria for percent recovery (%R) criteria, with the exception of Arsenic (40.6%) and Lead (177.5%), which were outside the acceptance criteria (80-120%). All affected data were qualified accordingly.

## **GENERAL CHEMISTRY DATA REVIEW**

General Chemistry data review includes review of analyses for Total Petroleum Hydrocarbons (TPH) and cyanide. There are currently no Region 1 functional guidelines for data validation of general chemistry parameters. Therefore, general chemistry data are evaluated based upon the QC requirements specified in the method by which they were analyzed.

## **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Agreement with Chain of Custody
- Preservation and Holding Time
- Initial Calibration Verification
- Continuing Calibration Verification
- Blanks
- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Laboratory Control Sample
- Detection Limit Results

## **DISCUSSION**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

All PE data for TPH and cyanide were within the vendor-certified acceptance limits.

### **Preservation and Holding Times**

All samples analyzed for TPH and cyanide were extracted within method-specified holding times.

### **Initial Calibration Verification**

The initial calibration was analyzed at the appropriate frequency. The correlation coefficient for the initial calibration curve was greater than 0.9950. All initial calibration QC acceptance criteria were met.

### **Continuing Calibration Verification**

The continuing calibrations were analyzed at the appropriate frequency. The %Rs were within +/- 10% for all continuing calibration analyses. All QC acceptance criteria were met.

### **Blanks**

No positive detects were reported in the associated method blanks. All QC acceptance criteria for the blanks were acceptable

### **Matrix Spike**

The MS / MSD was within QC acceptance limits for TPH and cyanide.

### **Field Duplicate**

A field duplicate pair was not submitted with this data set.

### **Laboratory Duplicate**

Laboratory precision was demonstrated through laboratory duplicate analysis. All sample duplicate results were within QC acceptance limits for duplicate RPD.

### **Laboratory Control Sample**

All QC acceptance criteria were met for LCS for TPH and cyanide.

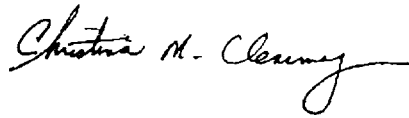
### **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical

error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. The data in this data package have been qualified as rejected (R) or estimated (J) depending upon the degree of analytical and / or sampling error. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

Chloroethane was estimated due to low matrix spike % recovery. Some SVOC compounds were estimated due to high RPD on the MS/MSD analysis. Lead and arsenic were estimated due to high/low LCS % recovery.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in Remedial Action Work Plan have been met.



Authorized Pratt & Whitney Representative





Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 02/18/02

Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 02/13/02

---

A Tier II data validation was performed on data for six soil samples collected on February 13, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-12-033 through WT-CS-12-038. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E202463 (batch 13354).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table 2 of this report.

## **PCB ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.*

A performance evaluation sample was not submitted with this data set.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 10°C, which was not within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour.

## **Agreement with the Chain of Custody**

Seven samples were shipped to Premier Laboratory under chain of custody on 02/13/02. Six of these samples were analyzed for PCBs by SW846 Method 8082. Validation of PCBs is discussed in this report. No discrepancies were noted.

## **Initial Calibration and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

Initial calibration curves were performed on GC4. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC 4. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

## **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

No detects were reported in the method blank.

## **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

The laboratory performed a PCB matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001869. Aroclor 1254 was spiked into the MS and MSD samples. Percent recovery and relative percent difference were within acceptance limits. All data were accepted as reported in the unspiked sample.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.

### **Field Duplicate**

A field duplicate pair was not submitted with this data set.

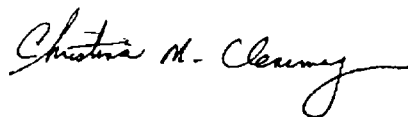
### **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality

Objectives (DQOs) and resultant “total error” of the data.

No data qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

A handwritten signature in black ink, appearing to read "Christina M. Cleary". The signature is fluid and cursive, with a long horizontal stroke extending to the right.

Authorized Pratt & Whitney Representative



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 03/04/02

Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 02/13/02

---

A Tier II data validation was performed on data for three soil samples collected on February 13, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. A trip blank was included with the sample delivery group. The samples discussed in this validation memorandum were analyzed for VOCs by SW846 Method 8260B, SVOCs by SW846 Method 8270C, TPH by USEPA 418.1, Metals by SW846 Method 6010B and Cyanide by SW846 Method 9012. These parameters are herein referred to as the "other parameters." Validation for the samples submitted for PCBs by SW846 Method 8082 are presented in a separate validation report.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT103. The internal laboratory lot number associated with this sample delivery group is E202463.

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Organic Data Review (December 1996), Pesticides / PCBs Data Review (July 1988) and Inorganic Data Review (February 1989) as appropriate. Chemistry parameters were validated using the same logic as presented in Region 1, EPA validation guidelines for other parameters where applicable. Since there is no official guidance at this time for

validating general chemistry analyses. Technical judgement was applied when applicable and necessary.

The following tables have been included in this report: Table I: Summary of Tier II Data Assessment, Table II Samples associated with the sample delivery group (SDG), Table III: Summary of Data Validation Qualifiers applied to samples as a result of the validation, and Table IV: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table II of this report.

## **ORGANIC DATA REVIEW**

Organic data review includes review of analyses for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs).

## **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Surrogate Compounds
- Agreement with Chain-of-Custody
- Internal Standards
- Preservation and Holding Time
- Matrix Spike / Matrix Spike Duplicate
- GC/MS Instrument Performance Check
- Laboratory Control Sample

- Initial and Continuing Calibration
- Practical Quantitation Limits
- Blanks
- Tentatively Identified compounds



## **DISCUSSION**

### **Agreement of Analyses with Chain of Custody**

*Sample reports are checked to verify that the reported results corresponded to analytical requests as detailed on the chain-of-custody record. The chain-of-custody form is reviewed for accuracy and completeness.*

Samples were relinquished to Premier Laboratory, LLC under chain-of-custody on February 13, 2002. The laboratory received the samples on February 13, 2002. During validation, the chain-of-custody form was reviewed for accuracy and completeness. No discrepancies were noted.

## **VOLATILE ORGANIC ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The sample cooler temperatures recorded by the laboratory were 10.0°C. The QC

acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice and in addition, all VOC soil samples were preserved on site in methanol according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

### **GC/MS Instrument Performance Check**

*Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.*

All ion abundance acceptance criteria specified in the methods for VOCs were met for each 12-hour period that samples were analyzed.

### **Initial and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

All VOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

A trip blank (2001874) and all method blanks were evaluated for contamination for

VOCs. No detects were reported.

### **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for VOCs.

### **Internal Standards**

*Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.*

All VOC data for the QC acceptance criteria were met for internal standard (IS) area counts and retention times.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

The laboratory performed a VOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001869. The following table summarizes data, which did not meet QC acceptance criteria:

Compound	%Rec MS	%Rec MSD	QC limits	RPD	RPD limits	Positive detects	NDs	Bias	Affected Samples
Chloroethane	49	46	60-142			J	J	Low	2001869
Bromomethane	46		50-147			J	J	Low	2001869

All affected data were qualified accordingly.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All data met the QC acceptance criteria for percent recovery for the VOC laboratory control sample(s).

### **Field Duplicate**

A field duplicate pair was not submitted with this data set.

### **Tentatively Identified Compounds**

No tentatively identified compounds were reported.

## **SEMIVOLATILE ORGANIC ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on*

*laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The sample cooler temperature recorded by the laboratory was 10.0°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

### **GC/MS Instrument Performance Check**

*Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.*

All ion abundance acceptance criteria specified in the methods SVOCs were met for each 12-hour period that samples were analyzed.

### **Initial and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

All SVOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

All method blanks were evaluated for contamination for SVOCs. No detects were reported.

### **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for SVOCs.

### **Internal Standards**

*Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.*

All SVOC data for the QC acceptance criteria were met for internal standard (IS) area counts and retention times.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine*

*laboratory precision and method bias for specific sample matrices.*

The laboratory performed an SVOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001869. All data were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All data met the QC acceptance criteria for percent recovery for the SVOC laboratory control sample(s).

### **Field Duplicate**

A field duplicate pair was not submitted with this data set.

### **Tentatively Identified Compounds**

No tentatively identified compounds were reported.

## **INORGANIC DATA REVIEW**

### **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- Performance Evaluation Data
- Agreement with Chain of Custody
- Preservation and Technical Holding Times
- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Furnace AA / Post Digestion Spike

- Calibration Verification
- Laboratory Control Sample
- Blanks
- Serial Dilution Results
- ICP Interference Check Sample
- Detection Limit Results

## DISCUSSION

### Performance Evaluation Data

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

### Preservation and Holding Times

All samples were properly preserved and analyzed within method-specified holding times.

### Calibration Verification

*Compliance requirements are evaluated to ensure that the instrument is capable of producing acceptable quantitative data.*

All initial calibration verification (ICV) and continuing calibration verification (CCV) for all metals were analyzed at the appropriate frequency and were within control limits



### **Lab Fortified Blanks**

*Blank analyses were assessed to determine the existence and magnitude of contamination problems.*

All analytes were within acceptance limit for percent recovery for the lab fortified blank analyses.

### **ICP Interference Check Sample**

*The ICP interference check sample is evaluated to verify the laboratory's interelement and background correction factors.*

All data met the QC acceptance criteria.

### **Matrix Spike / Matrix Spike Duplicate**

*The matrix spike sample was evaluated to provide information about the effect of the sample matrix on the digestion and measurement methodology.*

A MS/MSD was performed on sample 2001869. All analytes were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses.

### **Laboratory Duplicates**

All analytes were within acceptance limits for Relative Percent Difference for the laboratory duplicate analyses. Criteria for acceptable duplicate precision is less than 35% RPD for sample results that are greater than five times the CRDL and +/- 2X CRDL for sample results that are less than the five times the CRDL.

## Field Duplicates

*Field duplicates were assessed to determine overall precision (i.e. field and laboratory precision).*

A field duplicate pair was not submitted with this data set.

## Laboratory Control Sample

*The laboratory control sample is evaluated to assess the efficiency of the digestion procedure.*

The following table summarizes data that did not meet acceptance criteria for percent recovery (%R) criteria:

Analyte	%R	%R Range	Detects	Non-detects	Samples affected
Arsenic	37.4	80-120	J	UJ	All samples in data set.
Lead	185.8	80-120	J	A	All samples in data set.

All data were qualified accordingly.

## GENERAL CHEMISTRY DATA REVIEW

General Chemistry data review includes review of analyses for Total Petroleum Hydrocarbons (TPH), and cyanide. There are currently no Region 1 functional guidelines for data validation of general chemistry parameters. Therefore, general chemistry data are evaluated based upon the QC requirements specified in the method by which they were analyzed.

## REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Agreement with Chain of Custody
- Preservation and Holding Time
- Initial Calibration Verification
- Continuing Calibration Verification
- Blanks
- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Laboratory Control Sample
- Detection Limit Results

## DISCUSSION

### Performance Evaluation Data

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

### Preservation and Holding Times

All samples analyzed for TPH and cyanide were extracted within method-specified holding times.

### **Initial Calibration Verification**

The initial calibration was analyzed at the appropriate frequency. The correlation coefficient for the initial calibration curve was greater than 0.9950. All initial calibration QC acceptance criteria were met.

### **Continuing Calibration Verification**

The continuing calibrations were analyzed at the appropriate frequency. The %Rs were within +/- 10% for all continuing calibration analyses. All QC acceptance criteria were met.

### **Blanks**

No positive detects were reported in the associated method blanks. All QC acceptance criteria for the blanks were acceptable

### **Matrix Spike**

A MS/MSD was performed on sample 2001869. All analytes were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses.

### **Field Duplicate**

A field duplicate pair was not submitted with this data set.

### **Laboratory Duplicate**

Laboratory precision was demonstrated through laboratory duplicate analysis. All sample duplicate results were within QC acceptance limits for duplicate RPD.

## **Laboratory Control Sample**

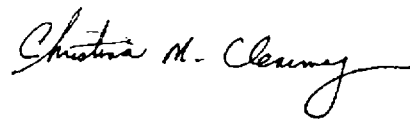
All QC acceptance criteria were met for LCS for TPH and cyanide.

## **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. The data in this data package have been qualified as rejected (R) or estimated (J) depending upon the degree of analytical and / or sampling error. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

Chloroethane and Bromomethane were estimated due to low MS/MSD % recovery. Arsenic was estimated due to low LCS % recovery. Lead was estimated due to high LCS % recovery. A description of the qualified sample results are outlined in Tables 3 and 4 specific to each parameter and are attached to this validation report.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in Remedial Action Work Plan have been met.



Authorized Pratt & Whitney Representative



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 02/13/02

Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 02/11/02

---

A Tier II data validation was performed on data for fifteen soil samples collected on February 11, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-12-019 through WT-CS-12-032. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E202350 (batch 13291).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table 2 of this report.

## **PCB ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.*

A double blind aqueous performance evaluation sample (2001861) was submitted with this data set. The PE sample was prepared by Environmental Resource Associates (ERA). The ERA lot number associated with this sample was 0204-02-11.6. Aroclor 1254 was spiked into the sample at a concentration of 5.09 ug/l. The performance acceptance limit was 2.61-6.72 ug/l. The laboratory reported a concentration of 4.3 ug/l. QC acceptance criteria were met. Performance data is presented in Attachment 1 of this report.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 9.0°C, which was not within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour.

### **Agreement with the Chain of Custody**

Twenty-three samples were shipped to Premier Laboratory under chain of custody on 02/07/02. Sixteen of these samples were analyzed for PCBs by SW846 Method 8082. Validation of PCBs is discussed in this report. No discrepancies were noted.

### **Initial Calibration and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

Initial calibration curves were performed on GC4. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC 4. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

No detects were reported in the method blank.



## **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. High surrogate recovery was reported in samples 2001857 and 2001858 probably as a result of double spiking by the technician. The laboratory reextracted and reanalyzed the sample. Surrogate recovery was acceptable. All other samples were reported with acceptable surrogate recovery.

## **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

The laboratory performed a PCB matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001846. Aroclor 1254 was spiked into the MS and MSD samples. Percent recovery and relative percent difference were within acceptance limits. All data were accepted as reported in the unspiked sample.

## **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.

## **Field Duplicate**

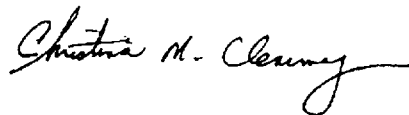
Samples 2001858 / 2001859 were submitted as field duplicate pair. The RPD for 2001858 / 2001859 were not calculated since both results were non-detect.

## **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

No data qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.



Authorized Pratt & Whitney Representative



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 03/04/02

Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 02/11/02

---

A Tier II data validation was performed on data for eight soil samples collected on February 11, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. A trip blank and performance evaluation samples were included with the sample delivery group. The samples discussed in this validation memorandum were analyzed for VOCs by SW846 Method 8260B, SVOCs by SW846 Method 8270C, TPH by USEPA 418.1, Metals by SW846 Method 6010B and Cyanide by SW846 Method 9012. These parameters are herein referred to as the "other parameters." Validation for the samples submitted for PCBs by SW846 Method 8082 are presented in a separate validation report.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT103. The internal laboratory lot number associated with this sample delivery group is E202350.

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Organic Data Review (December 1996), Pesticides / PCBs Data Review (July 1988) and Inorganic Data Review (February 1989) as appropriate. Chemistry parameters were validated using the same logic as presented in Region 1, EPA validation guidelines for other parameters where applicable. Since there is no official guidance at this time for

validating general chemistry analyses. Technical judgement was applied when applicable and necessary.

The following tables have been included in this report: Table I: Summary of Tier II Data Assessment, Table II Samples associated with the sample delivery group (SDG), Table III: Summary of Data Validation Qualifiers applied to samples as a result of the validation, and Table IV: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table II of this report.

## **ORGANIC DATA REVIEW**

Organic data review includes review of analyses for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs).

## **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Agreement with Chain-of-Custody
- Preservation and Holding Time
- GC/MS Instrument Performance Check
- Surrogate Compounds
- Internal Standards
- Matrix Spike / Matrix Spike Duplicate
- Laboratory Control Sample

- Initial and Continuing Calibration
- Practical Quantitation Limits
- Blanks
- Tentatively Identified compounds

## **DISCUSSION**

### **Agreement of Analyses with Chain of Custody**

*Sample reports are checked to verify that the reported results corresponded to analytical requests as detailed on the chain-of-custody record. The chain-of-custody form is reviewed for accuracy and completeness.*

Samples were relinquished to Premier Laboratory, LLC under chain-of-custody on February 11, 2002. The laboratory received the samples on February 11, 2002. During validation, the chain-of-custody form was reviewed for accuracy and completeness. No discrepancies were noted.

### **VOLATILE ORGANIC ANALYSES**

#### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

Seventeen VOCs were spiked into the sample. All the PE data were within vendor-certified acceptance limits.

#### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The sample cooler temperature recorded by the laboratory was 9.0°C. The QC

acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice and in addition, all VOC soil samples were preserved on site in methanol according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

### **GC/MS Instrument Performance Check**

*Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.*

All ion abundance acceptance criteria specified in the methods for VOCs were met for each 12-hour period that samples were analyzed.

### **Initial and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

All VOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations, with the exceptions of 4-Methyl-2-pentanone and 2-Hexanone, which were outside the continuing calibration acceptance criteria (31.1 %D and 31.5%D, respectively). All affected data were qualified as estimated.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

A trip blank (2001860) and all method blanks were evaluated for contamination for VOCs. No detects were reported.

### **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for VOCs.

### **Internal Standards**

*Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.*

All VOC data for the QC acceptance criteria were met for internal standard (IS) area counts and retention times.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

The laboratory performed a VOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001846. All data were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses.



### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All data met the QC acceptance criteria for percent recovery for the VOC laboratory control sample(s).

### **Field Duplicate**

Samples 2001858 / 2001859 were submitted as a field duplicate pair. The RPD for 2001858 / 2001859 was not calculated since both results were non-detect.

### **Tentatively Identified Compounds**

No tentatively identified compounds were reported.

## **SEMIVOLATILE ORGANIC ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

Thirty-nine SVOCs were spiked into the sample. All the PE data were within vendor-certified acceptance limits.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation*

*techniques used and the holding time of the sample, as appropriate.*

The sample cooler temperature recorded by the laboratory was 9.0°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

### **GC/MS Instrument Performance Check**

*Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.*

All ion abundance acceptance criteria specified in the methods SVOCs were met for each 12-hour period that samples were analyzed.

### **Initial and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

All SVOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations, with the exception of Hexachlorocyclopentadiene and bis(2-chloroisopropyl) ether, which were outside the continuing calibration acceptance criteria (40 %D and 26.2 %D, respectively). All affected data were qualified as estimated.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

All method blanks were evaluated for contamination for SVOCs. No detects were reported.

### **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for SVOCs.

### **Internal Standards**

*Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.*

All SVOC data for the QC acceptance criteria were met for internal standard (IS) area counts and retention times.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

The laboratory performed an SVOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001846. All data were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses.

## **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All data met the QC acceptance criteria for percent recovery for the SVOC laboratory control sample(s).

## **Field Duplicate**

Samples 2001858 / 2001859 were submitted as a field duplicate pair. The RPD for 2001858 / 2001859 were not calculated since both results were non-detect.

## **Tentatively Identified Compounds**

No tentatively identified compounds were reported.

## **INORGANIC DATA REVIEW**

### **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- |  |                                     |
|--|-------------------------------------|
| ▪ Performance Evaluation Data              | ▪ Matrix Spike                      |
| ▪ Agreement with Chain of Custody          | ▪ Field Duplicates                  |
| ▪ Preservation and Technical Holding Times | ▪ Laboratory Duplicates             |
| ▪ Calibration Verification                 | ▪ Furnace AA / Post Digestion Spike |
| ▪ Blanks                                   | ▪ Laboratory Control Sample         |
| ▪ ICP Interference Check Sample            | ▪ Serial Dilution Results           |
|  | ▪ Detection Limit Results           |

## **DISCUSSION**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

Eleven Metals were spiked into the sample. All the PE data were within vendor-certified acceptance limits.

### **Preservation and Holding Times**

All samples were properly preserved and analyzed within method-specified holding times.

### **Calibration Verification**

*Compliance requirements are evaluated to ensure that the instrument is capable of producing acceptable quantitative data.*

All initial calibration verification (ICV) and continuing calibration verification (CCV) for all metals were analyzed at the appropriate frequency and were within control limits

### **Lab Fortified Blanks**

*Blank analyses were assessed to determine the existence and magnitude of contamination problems.*

All analytes were within acceptance limit for percent recovery for the lab fortified

blank analyses.

### **ICP Interference Check Sample**

*The ICP interference check sample is evaluated to verify the laboratory's interelement and background correction factors.*

All data met the QC acceptance criteria.

### **Matrix Spike / Matrix Spike Duplicate**

*The matrix spike sample was evaluated to provide information about the effect of the sample matrix on the digestion and measurement methodology.*

A MS/MSD was performed on sample 2001846. All analytes were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses.

### **Laboratory Duplicates**

All analytes were within acceptance limits for Relative Percent Difference for the laboratory duplicate analyses. Criteria for acceptable duplicate precision is less than 35% RPD for sample results that are greater than five times the CRDL and +/- 2X CRDL for sample results that are less than the five times the CRDL.

### **Field Duplicates**

*Field duplicates were assessed to determine overall precision (i.e. field and laboratory precision).*

Samples 2001858 / 2001859 were submitted as a field duplicate pair. The following table summarizes duplicate precision data:

Compound	Sample # 2001858 (mg/kg)	Duplicate # 2001859 (mg/kg)	RPD	Action	Affected Samples
Barium	9.1	5.2	55%	J	2001858, 2001859
Chromium	2.5	1.6	44%	A	2001858, 2001859
Copper	2.1	ND	NC	J	2001858, 2001859
Lead	3.3	.59	139%	J	2001858, 2001859
Nickel	2.7	1.7	45%	A	2001858, 2001859
Zinc	3.7	2.8	28%	A	2001858, 2001859

Acceptable duplicate precision for non-aqueous samples is <50% RPD for results greater than two times the detection limit. Results were within QC acceptance limits for chromium, nickel and zinc. The RPD was not calculated (NC) for Copper; however, the results were qualified since one result was less than the detection limit and the other result was greater than two times the detection limit. All affected data were qualified accordingly.

### **Laboratory Control Sample**

*The laboratory control sample is evaluated to assess the efficiency of the digestion procedure.*

The following table summarizes data that did not meet acceptance criteria for percent recovery (%R) criteria:

Analyte	%R	%R Range	Detects	Non-detects	Samples affected
Lead	154.0	80-120	J	A	All samples in data set.

All data were qualified accordingly.

## **GENERAL CHEMISTRY DATA REVIEW**

General Chemistry data review includes review of analyses for Total Petroleum Hydrocarbons (TPH), and cyanide. There are currently no Region 1 functional guidelines for data validation of general chemistry parameters. Therefore, general chemistry data are evaluated based upon the QC requirements specified in the method by which they were analyzed.

## **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Agreement with Chain of Custody
- Preservation and Holding Time
- Initial Calibration Verification
- Continuing Calibration Verification
- Blanks
- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Laboratory Control Sample
- Detection Limit Results

## **DISCUSSION**

### **Performance Evaluation Data**



*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

All the PE data for TPH and Cyanide were within vendor-certified acceptance limits.

### **Preservation and Holding Times**

All samples analyzed for TPH and cyanide were extracted within method-specified holding times.

### **Initial Calibration Verification**

The initial calibration was analyzed at the appropriate frequency. The correlation coefficient for the initial calibration curve was greater than 0.9950. All initial calibration QC acceptance criteria were met.

### **Continuing Calibration Verification**

The continuing calibrations were analyzed at the appropriate frequency. The %Rs were within +/- 10% for all continuing calibration analyses. All QC acceptance criteria were met.

### **Blanks**

No positive detects were reported in the associated method blanks. All QC acceptance criteria for the blanks were acceptable

### **Matrix Spike**

All MS/MSD data met the QC acceptance criteria for TPH and cyanide.

### **Field Duplicate**

Samples 2001858 / 2001859 submitted as a field duplicate pair. The following table summarizes duplicate precision data:

<b>Compound</b>	<b>Sample # 2001858 (mg/kg)</b>	<b>Duplicate # 2001859 (mg/kg)</b>	<b>RPD</b>	<b>Action</b>	<b>Affected Samples</b>
TPH	470	230	69%	J	2001858, 2001859

Acceptable duplicate precision for non-aqueous samples is <50% RPD for results greater than two times the detection limit. All affected data were qualified accordingly.

### **Laboratory Duplicate**

Laboratory precision was demonstrated through laboratory duplicate analysis. All sample duplicate results were within QC acceptance limits for duplicate RPD.

### **Laboratory Control Sample**

All QC acceptance criteria were met for LCS for TPH and cyanide.

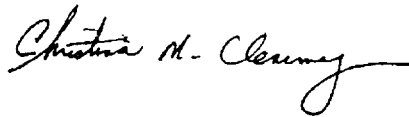
### **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. The data in this data package have been qualified as rejected (R) or estimated (J) depending upon the degree of analytical and / or sampling error. Ultimately, the end user should assess data

usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

2-Hexanone and 4-Methyl-2-pentanone was estimated due to high continuing calibration drift. Hexachlorocyclopentadiene and bis(2-chloroisopropyl) ether were qualified as estimated due to high continuing calibration drift. TPH and some metal compounds were estimated due to poor field duplicate precision. A description of the qualified sample results are outlined in Tables 3 and 4 specific to each parameter and are attached to this validation report.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in Remedial Action Work Plan have been met.



Authorized Pratt & Whitney Representative



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 02/8/02

Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 02/06/02

---

A Tier II data validation was performed on data for five soil samples collected on February 6, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-13-13 through WT-CS-13-17. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E202180 (batch 13185).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table 2 of this report.

## **PCB ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.*

A performance evaluation sample was not submitted with this data set.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 6.0°C, which was within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour.

## **Agreement with the Chain of Custody**

Five samples were shipped to Premier Laboratory under chain of custody on 02/06/02. All of the samples were analyzed for PCBs by SW846 Method 8082. Validation of PCBs is discussed in this report. No discrepancies were noted.

## **Initial Calibration and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

Initial calibration curves were performed on GC4. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC 4. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

## **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

No detects were reported in the method blanks.

## **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

The laboratory performed a PCB matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001830. Percent recovery and relative percent difference were within acceptance limits. All data were accepted as reported in the unspiked sample.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.

### **Field Duplicate**

A field duplicate pair was not submitted with this data set.

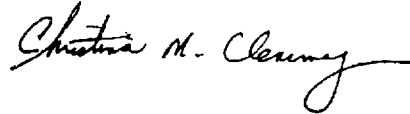
### **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality

Objectives (DQOs) and resultant “total error” of the data.

No data qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

A handwritten signature in black ink, reading "Christina M. Cleary". The signature is fluid and cursive, with a long horizontal stroke extending from the end.

Authorized Pratt & Whitney Representative





Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 02/8/02

Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 02/05/02

---

A Tier II data validation was performed on data for thirteen soil samples collected on February 5, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-13-001 through WT-CS-13-12. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E202132 (batch 13178).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table 2 of this report.

## **PCB ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.*

A double blind aqueous performance evaluation sample (2001829) was submitted with this data set. The PE sample was prepared by Environmental Resource Associates (ERA). The ERA lot number associated with this sample was 0126-02-01.6. Aroclor 1254 was spiked into the sample at a concentration of 2.04 ug/l. The performance acceptance limit was 1.04-2.69 ug/l. The laboratory reported a concentration of 2.0 ug/l. QC acceptance criteria were met. Performance data is presented in Attachment 1 of this report.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 4.0°C, which was within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour.

### **Agreement with the Chain of Custody**

Fifteen samples were shipped to Premier Laboratory under chain of custody on 02/05/02. Fourteen of the samples were analyzed for PCBs by SW846 Method 8082. Validation of PCBs is discussed in this report. No discrepancies were noted.

### **Initial Calibration and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

Initial calibration curves were performed on GC4 and GC8. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All percent relative standard deviations (%RSD) were less than 20%.

Continuing calibration verifications were performed on GC 4 and GC8. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

No detects were reported in the method blanks.

## **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs.

## **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

The laboratory performed a PCB matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001816. Percent recovery and relative percent difference were within acceptance limits. All data were accepted as reported in the unspiked sample.

## **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.

## **Field Duplicate**

Samples 1990916 and 1990917 were submitted as a field duplicate pair. The following table summarizes duplicate precision data:

Compound	Sample # 2001824 (mg/kg)	Duplicate # 2001825 (mg/kg)	RPD	Action	Affected Samples
Aroclor 1254	270	500	60%	J	2001824, 2001825

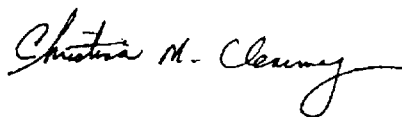
Acceptable duplicate precision for non-aqueous samples is <50% RPD for results greater than two times the detection limit. Results were not within QC acceptance limits.

### **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

Aroclor 1254 was estimated for samples 2001824 / 2001825 due to poor field duplicate precision (high RPD).

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.



Authorized Pratt & Whitney Representative



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 02/11/02

Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 02/05/02

---

A Tier II data validation was performed on data for seven soil samples collected on February 5, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. A trip blank was included with the sample delivery group. The samples discussed in this validation memorandum were analyzed for VOCs by SW846 Method 8260B, SVOCs by SW846 Method 8270C, TPH by USEPA 418.1, Metals by SW846 Method 6010B and Cyanide by SW846 Method 9012. These parameters are herein referred to as the "other parameters." Validation for the samples submitted for PCBs by SW846 Method 8082 are presented in a separate validation report.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT103. The internal laboratory lot number associated with this sample delivery group is E202132.

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Organic Data Review (December 1996), Pesticides / PCBs Data Review (July 1988) and Inorganic Data Review (February 1989) as appropriate. Chemistry parameters were validated using the same logic as presented in Region 1, EPA validation guidelines for other parameters where applicable. Since there is no official guidance at this time for

validating general chemistry analyses. Technical judgement was applied when applicable and necessary.

The following tables have been included in this report: Table I: Summary of Tier II Data Assessment, Table II Samples associated with the sample delivery group (SDG), Table III: Summary of Data Validation Qualifiers applied to samples as a result of the validation, and Table IV: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table II of this report.

## **ORGANIC DATA REVIEW**

Organic data review includes review of analyses for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs).

## **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- |                                      |   |
|--------------------------------------|---|
| ▪ Performance Evaluation Sample Data | ▪ Surrogate Compounds                   |
| ▪ Agreement with Chain-of-Custody    | ▪ Internal Standards                    |
| ▪ Preservation and Holding Time      | ▪ Matrix Spike / Matrix Spike Duplicate |
| ▪ GC/MS Instrument Performance Check | ▪ Laboratory Control Sample             |

- Initial and Continuing Calibration
- Practical Quantitation Limits
- Blanks
- Tentatively Identified compounds



## **DISCUSSION**

### **Agreement of Analyses with Chain of Custody**

*Sample reports are checked to verify that the reported results corresponded to analytical requests as detailed on the chain-of-custody record. The chain-of-custody form is reviewed for accuracy and completeness.*

Samples were relinquished to Premier Laboratory, LLC under chain-of-custody on February 5, 2002. The laboratory received the samples on February 5, 2002. During validation, the chain-of-custody form was reviewed for accuracy and completeness. No discrepancies were noted.

## **VOLATILE ORGANIC ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The sample cooler temperature recorded by the laboratory was 4.0°C. The QC

acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice and in addition, all VOC soil samples were preserved on site in methanol according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

### **GC/MS Instrument Performance Check**

*Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.*

All ion abundance acceptance criteria specified in the methods for VOCs were met for each 12-hour period that samples were analyzed.

### **Initial and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

All VOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

A trip blank (2001828) and all method blanks were evaluated for contamination for

VOCs. No detects were reported.

### **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for VOCs.

### **Internal Standards**

*Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.*

All VOC data for the QC acceptance criteria were met for internal standard (IS) area counts and retention times.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

The laboratory performed a VOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001816. The following table summarizes data, which did not meet QC acceptance criteria:

Compound	%Rec MS	%Rec MSD	QC limits	RPD	RPD limits	Positive detects	NDs	Bias	Affected Samples
Chloroethane	29	33	60-142			J	J	Low	2001816

All affected data were qualified accordingly.

### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All data met the QC acceptance criteria for percent recovery for the VOC laboratory control sample(s).

### **Field Duplicate**

Samples 2001824 / 2001825 were submitted as a field duplicate pair. The RPD for 2001605 / 2001606 were not calculated since both results were non-detect.

### **Tentatively Identified Compounds**

No tentatively identified compounds were reported.

## **SEMIVOLATILE ORGANIC ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and*

*direction of the quantitative bias.*

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The sample cooler temperature recorded by the laboratory was 4.0°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

### **GC/MS Instrument Performance Check**

*Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.*

All ion abundance acceptance criteria specified in the methods SVOCs were met for each 12-hour period that samples were analyzed.

### **Initial and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

All SVOC target compounds were within the QC acceptance criteria for the initial and

continuing calibrations, with the exception of 2-Nitroaniline, which was outside the continuing calibration acceptance criteria (32.4 %D).

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

All method blanks were evaluated for contamination for SVOCs. No detects were reported.

### **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for SVOCs. Since sample 2001820 had only one surrogate outside the acceptance range, no qualification was necessary.

### **Internal Standards**

*Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.*

The following table summarizes SVOC QC acceptance criteria that were not met for internal standard (IS) area counts and retention times:

Sample Number	Internal Standards	Area Counts	Ret. Time	Area counts QC Range	Ret.Time QC Range	Detect	Non-detect
---------------	--------------------	-------------	-----------	----------------------	-------------------	--------	------------

2001820	Chrysene-d12	1017012	22.40	1564932-6259728	22.40-22.72	J	UJ
2001820	Perylene-d12	297010 (<20%)	25.52	953796-3815182	24.94-25.94	J	R
2001816	Perylene-d12	1030890	25.46	1166796-4667186	24.93-25.93	J	UJ
2001816MS	Perylene-d12	981307	25.44	1166796-4667186	24.93-25.93	J	UJ
2001816MSD	Perylene-d12	753147	25.45	1166796-4667186	24.93-25.93	J	UJ
2001827	Perylene-d12	646547	25.47	1166796-4667186	24.93-25.93	J	UJ

All compounds quantitated using Chrysene-d12 and Perylene-d12 were qualified. Refer to SVOC Table 3 for a list of affected compounds.

#### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

The laboratory performed an SVOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001816. The following table summarizes data, which did not meet QC acceptance criteria:

Compound	%Rec MS	%Rec MSD	QC limits	RPD	RPD limits	Positive detects	NDs	Bias	Affected Samples
4-Chloroaniline	0	0	6-88			J	R	Low	2001816

2,4-Dinitrophenol	0	0	5-99			J	R	Low	2001816
Fluoranthene	13		16-192	125		J	J	Low	2001816
Hexachloroethane	0	0	10-85			J	R	Low	2001816
2-Methyl-4,6-Dinitrophenol	0	0	5-109			J	R	Low	2001816
3-Nitroaniline	0	0	17-98			J	R	Low	2001816
Pyrene				118	70	J	J	-	2001816

All affected data were qualified accordingly.

### Laboratory Control Sample

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All data met the QC acceptance criteria for percent recovery for the SVOC laboratory control sample(s).

### Field Duplicate

Samples 2001824 / 2001825 were submitted as a field duplicate pair. The following table summarizes duplicate precision data:

Compound	Sample # 2001824 (mg/kg)	Duplicate # 2001825 (mg/kg)	RPD	Action	Affected Samples



Fluoranthene	670	740	10%	A	2001824, 2001825
Phenanthrene	ND	280	NC	A	2001824, 2001825
Pyrene	470	520	NC	A	2001824, 2001825

Acceptable duplicate precision for non-aqueous samples is <50% RPD for results greater than two times the detection limit. Results were within QC acceptance limits for all compounds.

### **Tentatively Identified Compounds**

No tentatively identified compounds were reported.

## **INORGANIC DATA REVIEW**

### **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- Performance Evaluation Data
- Agreement with Chain of Custody
- Preservation and Technical Holding Times
- Calibration Verification
- Blanks
- ICP Interference Check Sample
- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Furnace AA / Post Digestion Spike
- Laboratory Control Sample
- Serial Dilution Results
- Detection Limit Results

## **DISCUSSION**

## **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

## **Preservation and Holding Times**

All samples were properly preserved and analyzed within method-specified holding times.

## **Calibration Verification**

*Compliance requirements are evaluated to ensure that the instrument is capable of producing acceptable quantitative data.*

All initial calibration verification (ICV) and continuing calibration verification (CCV) for all metals were analyzed at the appropriate frequency and were within control limits

## **Lab Fortified Blanks**

*Blank analyses were assessed to determine the existence and magnitude of contamination problems.*

All analytes were within acceptance limit for percent recovery for the lab fortified blank analyses.

### ICP Interference Check Sample

*The ICP interference check sample is evaluated to verify the laboratory's interelement and background correction factors.*

All data met the QC acceptance criteria.

### Matrix Spike / Matrix Spike Duplicate

*The matrix spike sample was evaluated to provide information about the effect of the sample matrix on the digestion and measurement methodology.*

A MS/MSD was performed on sample 2001816. All analytes were within acceptance limits for % recovery (%R) and Relative Percent Difference (RPD) for the MS and MSD analyses. The following table summarizes MS/MSD data that did not meet acceptance criteria:

Analyte	MS %R	MSD %R	%R QC Range	Detects	Non-detects	Samples Affected
Chromium		66.0	75-125	J	UJ	All samples in data set
Copper	145.6	157.8	75-125	J	A	All samples in data set
Lead	200.0	215.8	75-125	J	A	All samples in data set
Mercury	171.6	170.2	75-125	J	A	All samples in data set

All affected data were qualified accordingly.

### Laboratory Duplicates

All analytes were within acceptance limits for Relative Percent Difference for the

laboratory duplicate analyses. Criteria for acceptable duplicate precision is less than 35% RPD for sample results that are greater than five times the CRDL and +/- 2X CRDL for sample results that are less than the five times the CRDL.

### Field Duplicates

*Field duplicates were assessed to determine overall precision (i.e. field and laboratory precision).*

Samples 2001824 / 2001825 were submitted as a field duplicate pair. The following table summarizes duplicate precision data:

Compound	Sample # 2001824 (mg/kg)	Duplicate # 2001825 (mg/kg)	RPD	Action	Affected Samples
Barium	47	37	24%	A	2001824, 2001825
Cadmium	22	9.6	78%	J	2001824, 2001825
Chromium	9500	5200	59%	J	2001824, 2001825
Copper	1700	1300	27%	A	2001824, 2001825
Lead	300	66	128%	J	2001824, 2001825
Nickel	630	460	31%	A	2001824, 2001825
Silver	6.5	2.4	92%	J	2001824, 2001825
Zinc	44	25	55%	J	2001824, 2001825

Mercury	.11	.042	89%	J	2001824, 2001825
---------	-----	------	-----	---	------------------

Acceptable duplicate precision for non-aqueous samples is <50% RPD for results greater than two times the detection limit. Results were within QC acceptance limits for barium copper and nickel. All affected data were qualified accordingly.

### **Laboratory Control Sample**

*The laboratory control sample is evaluated to assess the efficiency of the digestion procedure.*

The following table summarizes data that did not meet acceptance criteria for percent recovery (%R) criteria:

Analyte	%R	%R Range	Detects	Non-detects	Samples affected
Arsenic	40.8	80-120	J	UJ	All samples in data set.
Selenium	77.9	80-120	J	UJ	All samples in data set.
Zinc	74.3	80-120	J	UJ	All samples in data set.

All data were qualified accordingly.

### **GENERAL CHEMISTRY DATA REVIEW**

General Chemistry data review includes review of analyses for Total Petroleum Hydrocarbons (TPH), and cyanide. There are currently no Region 1 functional guidelines for data validation of general chemistry parameters. Therefore, general chemistry data are evaluated based upon the QC requirements specified in the method by which they were analyzed.

## REVIEW OF ELEMENTS

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Agreement with Chain of Custody
- Preservation and Holding Time
- Initial Calibration Verification
- Continuing Calibration Verification
- Blanks
- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Laboratory Control Sample
- Detection Limit Results

## DISCUSSION

### Performance Evaluation Data

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

A performance evaluation sample was not submitted with this data set. PEs are submitted at a frequency of one per 20 samples and are tracked on an on-going basis.

### Preservation and Holding Times

All samples analyzed for TPH and cyanide were extracted within method-specified holding times.

### Initial Calibration Verification

The initial calibration was analyzed at the appropriate frequency. The correlation coefficient for the initial calibration curve was greater than 0.9950. All initial calibration QC acceptance criteria were met.

### **Continuing Calibration Verification**

The continuing calibrations were analyzed at the appropriate frequency. The %Rs were within +/- 10% for all continuing calibration analyses. All QC acceptance criteria were met.

### **Blanks**

No positive detects were reported in the associated method blanks. All QC acceptance criteria for the blanks were acceptable

### **Matrix Spike**

The following table summarizes MS/MSD data that did not meet acceptance criteria:

Analyte	MS %R	MSD %R	%R QC Range	Detects	Non-detects	Samples Affected
TPH	590	490	12-170	J	A	All samples in data set
Cyanide	5.0	2.6	75-125	J	R	All samples in data set

All affected data were qualified accordingly.

### **Field Duplicate**

Samples 2001824 / 2001825 were submitted as a field duplicate pair. The following table summarizes duplicate precision data:

Compound	Sample # 2001824 (mg/kg)	Duplicate # 2001825 (mg/kg)	RPD	Action	Affected Samples
TPH	1700	910	61%	J	2001824, 2001825
Cyanide	ND	.90	NC	A	2001824, 2001825

Acceptable duplicate precision for non-aqueous samples is <50% RPD for results greater than two times the detection limit. Results were within QC acceptance limits for Cyanide. All affected data were qualified accordingly.

### **Laboratory Duplicate**

Laboratory precision was demonstrated through laboratory duplicate analysis. All sample duplicate results were within QC acceptance limits for duplicate RPD.

### **Laboratory Control Sample**

All QC acceptance criteria were met for LCS for TPH and cyanide.

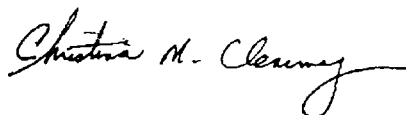
### **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. The data in this data package have been qualified as rejected (R) or estimated (J) depending upon the degree of analytical and / or sampling error. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.



Chloroethane was estimated due to low MS/MSD % recovery. Some SVOC compounds were qualified as rejected / estimated due to low MS/MSD %. Fluoranthene and Pyrene were estimated due to high RPD in the MS/MSD analyses. 2-Nitroaniline was qualified as estimated due to high continuing calibration drift. SVOC internal standard perylene-d12 associated compounds were qualified as estimated / rejected due to low area count for samples 2001816, 2001820 and 2001827. SVOC internal standard chrysene-d12 associated compounds were qualified as estimated due to low area count for samples 2001820. Metal compounds were estimated due to low / high MS / MSD % recovery. Arsenic, selenium, and zinc were estimated due to low LCS % recovery. TPH and some metal compounds were estimated due to poor field duplicate precision. TPH was qualified as due to high MS / MSD % recovery. Cyanide was qualified as estimated / rejected due to low MS / MSD % recovery. A description of the qualified sample results are outlined in Tables 3 and 4 specific to each parameter and are attached to this validation report.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in Remedial Action Work Plan have been met.



Authorized Pratt & Whitney Representative



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
DV Report Date: 01/30/02

Project Name: Willow Brook Pond PCB Remediation  
Sampled Date: 01/25/02

---

A Tier II data validation was performed on data for nineteen soil samples collected on January 25, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. The samples were collected from locations of the Site designated as WT-CS-12-001 through WT-CS-12-018. All samples were analyzed for PCBs by USEPA SW846 Method 8082.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT002-103. The internal laboratory lot number associated with this sample delivery group is E201956 (batches 12914 & 12981).

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Pesticides / PCBs, July 1988. Additional guidance and logic was obtained from the Functional Guidelines for Volatile / Semivolatile Data Validation Functional Guidelines, December 1996 when applicable. Technical judgement was also applied where applicable

The following tables have been included in this report: Table 1: Tier II Data

Assessment, Table 2: Samples associated with the sample delivery group (SDG), Table 3: Summary of Data Validation Qualifiers applied to samples as a result of the validation, Table 4: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table 2 of this report.

## **PCB ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias. The frequency for performance evaluation samples for this project is one per twenty field samples.*

A double blind aqueous performance evaluation sample (2001781) was submitted with this data set. The PE sample was prepared by Environmental Resource Associates (ERA). The ERA lot number associated with this sample was 0122-02-10.6. Aroclor 1254 was spiked into the sample at a concentration of 5.29 ug/l. The performance acceptance limit was 2.71-6.98 ug/l. The laboratory reported a concentration of 4.8 ug/l. QC acceptance criteria were met. Performance data is presented in Attachment 1 of this report.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The samples were extracted and analyzed within acceptable holding time. The sample temperature upon receipt was 7.0°C, 11.0°C, and 12.0°C, which was not within the acceptance limit of 4°C +/- 2°C. No qualification was applied based on sample temperature due to the logistics of the sample transport process. Samples were collected at ambient temperature, placed in a cooler on ice and immediately transferred to the courier. The trip from the Site to the laboratory is generally completed in approximately one hour.

### **Agreement with the Chain of Custody**

Twenty-six samples were shipped to Premier Laboratory under chain of custody on 01/25/02. Twenty-one of the samples were analyzed for PCBs by SW846 Method 8082. Validation of PCBs is discussed in this report. No discrepancies were noted.

### **Initial Calibration and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

Initial calibration curves were performed on GC4 and GC8. Equal concentrations of a mixture of Aroclors 1016 and 1260 were used. Calibration factors were calculated at five concentrations. All linear regression coefficients ( $R^2$ ) were greater than .990.

Continuing calibration verifications were performed on GC 4 and GC8. Each continuing calibration standard consisted of a mixture of Aroclors 1016 and 1260 and was performed at a single concentration. The percent drift (%D) was less than 15%. QC acceptance criteria were met for the continuing calibration.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

No detects were reported in the method blank.

## **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

Surrogates tetrachloro-m-xylene and decachlorobiphenyl were spiked into every sample. QC acceptance criteria was met for percent recovery (%R) for both surrogates in all of the field samples, QC samples and blanks analyzed for PCBs. Decachlorobiphenyl (2) was outside the acceptance limits (bias high) for sample 2001766. However, since only one surrogate was outside the acceptance limits, no qualification was necessary.

## **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

The laboratory performed a PCB matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil samples 2001762 and 2001770. Percent recovery and relative percent difference were within acceptance limits. All data were accepted as reported in the unspiked sample.

## **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

All QC acceptance criteria were met for percent recovery (%R) for the LCS samples.

## Field Duplicate

Samples 2001776 / 2001777 were submitted as field duplicate pairs. The following table summarizes duplicate precision data:

Compound	Sample # 2001776 (mg/kg)	Duplicate # 2001777 (mg/kg)	RPD	Action	Affected Samples
Aroclor 1254	460	740	47%	A	2001776, 2001777
Aroclor 1260	320	280	13%	A	2001776, 2001777

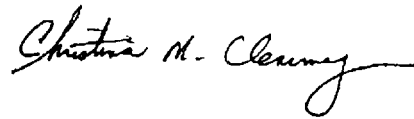
Acceptable duplicate precision for non-aqueous samples is <50% RPD for results greater than two times the detection limit. Results were within QC acceptance limits.

## OVERALL EVALUATION OF THE DATA

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.

No data were qualified.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in the Remedial Action Work Plan have been met.

A handwritten signature in black ink, reading "Christina M. Cleary". The signature is fluid and cursive, with a long horizontal stroke extending from the end.

Authorized Pratt & Whitney Representative



Loureiro Engineering Associates, Inc.

To: Brian Cutler / LEA  
From: Tina Clemmey / LEA  
Sample Date: 01/25/02  
DV Date: 01/31/02

Project Name: Willow Brook Pond PCB Remediation  
DV Report for Other Parameters

---

A Tier II data validation was performed on data for ten soil samples collected on January 25, 2002 for the Willow Brook Willow Pond PCB Remediation Project at Pratt & Whitney in East Hartford, Connecticut. A trip blank and performance samples were included with the sample delivery group. The samples discussed in this validation memorandum were analyzed for VOCs by SW846 Method 8260B, SVOCs by SW846 Method 8270C, TPH by USEPA 418.1, Metals by SW846 Method 6010B and Cyanide by SW846 Method 9012. These parameters are herein referred to as the "other parameters." Validation for the samples submitted for PCBs by SW846 Method 8082 are presented in a separate validation report.

The samples were submitted to Premier Laboratory, LLC in Brooklyn, CT. Premier processed and reported these samples under Project 88UT103. The internal laboratory lot number associated with this sample delivery group is E201956.

The sample results were assessed according to Region 1, EPA Data Validation Functional Guidelines for Evaluating Environmental Analyses: Organic Data Review (December 1996), Pesticides / PCBs Data Review (July 1988) and Inorganic Data Review (February 1989) as appropriate. Chemistry parameters were validated using the same logic as presented in Region 1, EPA validation guidelines for other



parameters where applicable. Since there is no official guidance at this time for validating general chemistry analyses. Technical judgement was applied when applicable and necessary.

The following tables have been included in this report: Table I: Summary of Tier II Data Assessment, Table II Samples associated with the sample delivery group (SDG), Table III: Summary of Data Validation Qualifiers applied to samples as a result of the validation, and Table IV: Summary of Qualified Analytical Results.

An explanation of the validation decisions is presented below.

## **SAMPLES**

Samples included in this review are listed in Table II of this report.

## **ORGANIC DATA REVIEW**

Organic data review includes review of analyses for volatile organic compounds (VOCs) and semivolatile organic compounds (SVOCs).

## **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- |                                      |   |
|--------------------------------------|---|
| ▪ Performance Evaluation Sample Data | ▪ Surrogate Compounds                   |
| ▪ Agreement with Chain-of-Custody    | ▪ Internal Standards                    |
| ▪ Preservation and Holding Time      | ▪ Matrix Spike / Matrix Spike Duplicate |
| ▪ GC/MS Instrument Performance Check | ▪ Laboratory Control Sample             |
| ▪ Initial and Continuing Calibration | ▪ Practical Quantitation Limits         |

- Blanks
- Tentatively Identified compounds

## **DISCUSSION**

### **Agreement of Analyses with Chain of Custody**

*Sample reports are checked to verify that the reported results corresponded to analytical requests as detailed on the chain-of-custody record. The chain-of-custody form is reviewed for accuracy and completeness.*

Twenty-six samples were relinquished to Premier Laboratory, LLC under chain-of-custody on January 25, 2002. The laboratory received the samples on January 25, 2002. Sixteen samples were selected for “other parameters.” During validation, the chain-of-custody form was reviewed for accuracy and completeness. No discrepancies were noted.

## **VOLATILE ORGANIC ANALYSES**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

Nineteen VOCs were spiked into the sample. All the PE data were within the vendor-certified acceptance limits.

### **Preservation and technical holding times**

*The validity of the analytical results is evaluated based on the preservation*

*techniques used and the holding time of the sample, as appropriate.*

The sample cooler temperature recorded by the laboratory was 7.0°C, 11.0°C, and 12.0°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice and in addition, all VOC soil samples were preserved on site in methanol according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times.

### **GC/MS Instrument Performance Check**

*Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.*

All ion abundance acceptance criteria specified in the methods for VOCs were met for each 12-hour period that samples were analyzed.

### **Initial and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

All VOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations.

### **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and*

*to subsequently assess their contribution to measurement error*

The trip blank (2001780) and the method blank were evaluated for contamination for VOCs. No detects were reported in the blanks.

### **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration target and/or non-target analytes, and poor laboratory performance.*

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for VOCs.

### **Internal Standards**

*Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.*

All internal standard area counts and retention times were within acceptance limits.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

The laboratory performed a VOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil samples 2001762 (Batch 12961) and 2001776 (Batch 12982). The following table summarizes data, which did not meet QC acceptance criteria:

Compound	%Rec MS	%Rec MSD	QC limits	RPD	Positive detects	NDs	Bias	Affected Samples
Chloroethane	48	45	60-142		J	J	Low	2001776
2-Hexanone	157	162	60-134		J	A	High	2001776
4-Methyl-2-pentanone	133	136	64-126		J	A	High	2001776
Chloroethane	48	43	60-142		J	J	Low	2001762

There were no detects reported in the unspiked samples. All affected data were qualified accordingly.

#### **Laboratory Control Sample**

*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

The laboratory control samples were within acceptance limits.

#### **Field Duplicate**

Samples 2001776 / 2001777 were submitted as a field duplicate pair. The relative percent difference was not calculated since no detects were reported in either sample.

#### **Tentatively Identified Compounds**

No tentatively identified compounds were reported.

#### **SEMIVOLATILE ORGANIC ANALYSES**

## Performance Evaluation Data

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

Forty SVOCs were spiked into the sample. The following table summarizes the following table summarizes the PE data that were not within vendor-certified acceptance limits:

Compound	Reported Concentration (ug/L)	Certified value (ug/L)	Acceptance Limits (ug/L)	Positive Detects	NDs	Bias	Affected Samples
Benzo(a)anthracene	16	25.0	17.2-26.2	J	J	Low	All samples in data set
Bis(2-chloroethoxy) Methane	52	118	62.2-124	J	J	Low	All samples in data set

All affected data were qualified accordingly.

## Preservation and technical holding times

*The validity of the analytical results is evaluated based on the preservation techniques used and the holding time of the sample, as appropriate.*

The sample cooler temperature recorded by the laboratory was 7.0°C, 11.0°C, and 12.0°C. The QC acceptance limit for sample temperature is 2°C – 6°C. Samples were not qualified based on sample temperature since the time from sample collection to transport to receipt at the laboratory is very short. All samples were placed on ice, according to SW846 Method 5035. All samples were extracted and analyzed within method specified holding times..

## **GC/MS Instrument Performance Check**

*Gas chromatograph / mass spectrometer (GC/MS) instrument performance (tuning) checks are evaluated to ensure proper mass calibration and resolution, identification and to some degree sensitivity.*

All ion abundance acceptance criteria specified in the methods SVOCs were met for each 12-hour period that samples were analyzed.

## **Initial and Continuing Calibration**

*Compliance requirements for initial and continuing calibrations are evaluated to ensure that the instruments are capable of producing acceptable qualitative and quantitative data.*

All SVOC target compounds were within the QC acceptance criteria for the initial and continuing calibrations. Hexachlorocyclopentadiene was outside the QC acceptance criteria (%D = 29.6%). Samples 2001764, 2001772, and 2001784 were qualified as Estimated (J).

## **Blanks**

*Blank analyses data is to determine the existence and magnitude of contamination problems resulting from laboratory and / or field activities and to subsequently assess their contribution to measurement error*

All method blanks were evaluated for contamination for SVOCs. No detects were reported.

## **Surrogate Compounds**

*Sample matrix effects and laboratory performance on individual samples are assessed by evaluating surrogate recovery. Poor surrogate recovery can be an indication of Interfering matrix effects, presence of high concentration*

*target and/or non-target analytes, and poor laboratory performance.*

QC acceptance criteria was met for percent recovery (%R) for surrogates in all of the field samples, QC samples and blanks analyzed for SVOCs.

### **Internal Standards**

*Instrument performance, stability and laboratory precision are evaluated by assessing internal standard area count recovery and retention time drift.*

All internal standard area counts and retention times were within acceptance limits.

### **Matrix Spike / Matrix Spike Duplicate Analyses**

*Data for matrix spike / matrix spike duplicates were evaluated to determine laboratory precision and method bias for specific sample matrices.*

The laboratory performed an SVOC matrix spike / matrix spike duplicate (MS/MSD) analyses on LEA soil sample 2001762. The following table summarizes data, which did not meet QC acceptance criteria:

Compound	%Rec MS	%Rec MSD	QC limits	% RPD	RPD limits	Positive detects	NDs	Bias	Affected Samples
3,3-Dichlorobenzidine	0	0	7-108			J	R	Low	2001762
4-Chloroaniline		0	6-88	200	41	J	R	Low / High	2001762

All affected data were qualified accordingly.

### **Laboratory Control Sample**



*Laboratory control samples are evaluated to assess the internal quality control of the laboratory's analytical method accuracy and method bias.*

The laboratory control samples were within acceptance limits.

### **Field Duplicate**

Samples 2001776 / 2001777 were submitted as a field duplicate pair. The following table summarizes duplicate precision data:

Compound	Sample # 2001776 (mg/kg)	Duplicate # 2001777 (mg/kg)	RPD	Action	Affected Samples
Acenaphthylene	ND	240	NC	A	2001776, 2001777
Benzo(a)anthracene	ND	430	NC	J	2001776, 2001777
Benzo(a)pyrene	ND	570	NC	J	2001776, 2001777
Benzo(b)fluoranthene	ND	550	NC	J	2001776, 2001777
Benzo(g,h,i)perylene	ND	320	NC	A	2001776, 2001777
Benzo(k)fluoranthene	ND	570	NC	J	2001776, 2001777
Chrysene	ND	620	NC	J	2001776, 2001777
Fluoranthene	350	1200	110%	J	2001776, 2001777
Indeno(1,2,3-cd)pyrene	ND	300	NC	A	2001776, 2001777

Pyrene	330	1100	108%	J	2001776, 2001777
Phenanthrene	ND	460	NC	J	2001776, 2001777

Acceptable duplicate precision for non-aqueous samples is <50% RPD for results greater than two times the detection limit. Results were within QC acceptance limits for acenaphthylene, benzo(g,h,i)perylene, and indeno(1,2,3-cd)pyrene. The RPD was not calculated (NC) for other SVOC compounds; however, the results were qualified since results were less than the detection limit and the other results were greater than two times the detection limit.

### **Tentatively Identified Compounds**

No tentatively identified compounds were reported.

## **INORGANIC DATA REVIEW**

### **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- Performance Evaluation Data
- Agreement with Chain of Custody
- Preservation and Technical Holding Times
- Calibration Verification
- Blanks
- ICP Interference Check Sample
- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Furnace AA / Post Digestion Spike
- Laboratory Control Sample
- Serial Dilution Results
- Detection Limit Results

## **DISCUSSION**

### **Performance Evaluation Data**

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

Eleven metals were spiked into the sample. All the PE data were within vendor-certified acceptance limits

### **Preservation and Holding Times**

All samples were properly preserved and analyzed within method-specified holding times.

### **Calibration Verification**

*Compliance requirements are evaluated to ensure that the instrument is capable of producing acceptable quantitative data.*

All initial calibration verification (ICV) and continuing calibration verification (CCV) for all metals were analyzed at the appropriate frequency and were within control limits

### **Lab Fortified Blanks**

*Blank analyses were assessed to determine the existence and magnitude of contamination problems.*

All analytes were within acceptance limit for percent recovery for the lab fortified

blank analyses.

### **ICP Interference Check Sample**

*The ICP interference check sample is evaluated to verify the laboratory's interelement and background correction factors.*

All data met the QC acceptance criteria.

### **Matrix Spike / Matrix Spike Duplicate**

*The matrix spike sample was evaluated to provide information about the effect of the sample matrix on the digestion and measurement methodology.*

A MS/MSD was performed on sample 2001762. All MS/MSD data met the QC acceptance criteria.

### **Laboratory Duplicates**

All analytes were within acceptance limits for Relative Percent Difference for the laboratory duplicate analyses. Criteria for acceptable duplicate precision is less than 35% RPD for sample results that are greater than five times the CRDL and  $\pm 2X$  CRDL for sample results that are less than the five times the CRDL.

### **Field Duplicates**

*Field duplicates were assessed to determine overall precision (i.e. field and laboratory precision).*

Samples 2001776 / 2001777 were submitted as a field duplicate pair. The following table summarizes duplicate precision data:

Compound	Sample # 2001776	Duplicate # 2001777	RPD	Action	Affected Samples
Barium	17	17	0%	A	2001776, 2001777
Chromium	11	9.1	19%	A	2001776, 2001777
Copper	8.8	7.8	12%	A	2001776, 2001777
Lead	10	10	0%	A	2001776, 2001777
Nickel	8.8	7.9	11%	A	2001776, 2001777
Silver	.20	.16	22%	A	2001776, 2001777
Zinc	18	18	0%	A	2001776, 2001777
Mercury	.048	.030	46%	A	2001776, 2001777

Acceptable duplicate precision for non-aqueous samples is <50% RPD for results greater than two times the detection limit. Results were within QC acceptance limits.

#### **Laboratory Control Sample**

*The laboratory control sample is evaluated to assess the efficiency of the digestion procedure.*

The following table summarizes data that did not meet acceptance criteria (80-120%) for percent recovery (%R) criteria:

Analyte	%R	%R Range	Detects	Non-detects	Samples affected
Arsenic	76.5%	80-120%	J	J	All
Selenium	123.5%	80-120%	J	A	All

All data were qualified accordingly.

### **GENERAL CHEMISTRY DATA REVIEW**

General Chemistry data review includes review of analyses for Total Petroleum Hydrocarbons (TPH). There are currently no Region 1 functional guidelines for data validation of general chemistry parameters. Therefore, general chemistry data are evaluated based upon the QC requirements specified in the method by which they were analyzed.

### **REVIEW OF ELEMENTS**

Sample data were reviewed for the following parameters:

- Performance Evaluation Sample Data
- Agreement with Chain of Custody
- Preservation and Holding Time
- Initial Calibration Verification
- Continuing Calibration Verification
- Blanks
- Matrix Spike
- Field Duplicates
- Laboratory Duplicates
- Laboratory Control Sample
- Detection Limit Results

## DISCUSSION

### Performance Evaluation Data

*Data for performance evaluation samples (PEs) are generated to provide information on the overall accuracy and bias of the analytical method and on laboratory performance. The PE is evaluated to assess the magnitude and direction of the quantitative bias.*

The following table summarizes performance data that did not meet vendor certified acceptance criteria:

Compound	Reported Concentration (mg/L)	Certified value (ug/L)	Acceptance Limits (ug/L)	Positive Detects	NDs	Bias	Affected Samples
TPH	120	94.7	56.8-118.0	J	A	High	All samples in data set

All data were qualified accordingly.

### Preservation and Holding Times

All samples analyzed for TPH were extracted within method-specified holding times.

### Initial Calibration Verification

The initial calibration was analyzed at the appropriate frequency. All initial calibration QC acceptance criteria were met.

### Continuing Calibration Verification

The continuing calibrations were analyzed at the appropriate frequency. The %Rs

were within +/- 10% for all continuing calibration analyses. All QC acceptance criteria were met.

### **Blanks**

No positive detects were reported in the associated method blanks. All QC acceptance criteria for the blanks were acceptable.

### **Matrix Spike**

A MS / MSD was performed on sample 2001762 and was within QC acceptance limits for %R and RPD for TPH.

### **Field Duplicate**

Samples 2001776 / 2001777 were submitted as a field duplicate pair. Results for the analyses were within QC acceptance limits.

### **Laboratory Control Sample**

All QC acceptance criteria were met for LCS for TPH.

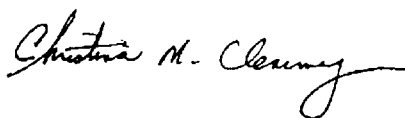
## **OVERALL EVALUATION OF THE DATA**

The objective of the final evaluation of this data package is to identify the “analytical error” and any “sampling error” associated with the data. The sum of the “analytical error” and the “sampling error” equals the “measurement error.” The end user should use the “measurement error” in conjunction with sampling variability to determine “total error” (total uncertainty) associated with the data. The data in this data package have been qualified as rejected (R) or estimated (J) depending upon the degree of analytical and / or sampling error. Ultimately, the end user should assess data usability in the context of the pre-determined Data Quality Objectives (DQOs) and resultant “total error” of the data.



Chloroethane was estimated based on low percent recovery for the MS / MSD analyses. Some SVOC compounds were estimated due to high RPD in field duplicate analyses. 4-Chloroaniline and 3,3-Dichlorobenzidine were rejected due to low % recovery in the MS/MSD analyses. Hexachlorocyclopentadiene was estimated due to high continuing calibration drift. Benzo(a)anthracene and bis(2-Chloroethoxy)methane were estimated due to low PE results. Arsenic results were qualified as estimated based on low percent recovery for the LCS sample. Selenium results were qualified as estimated based on high percent recovery for the LCS sample. TPH was qualified as estimated due to high PE result data. A description of the qualified sample results are outlined in Tables 3 and 4 specific to each parameter and are attached to this validation report.

To the best of my knowledge, after thorough review of the attached sampling data and validation information, I believe that the data does show that the Performance Standards identified in Remedial Action Work Plan have been met.

A handwritten signature in black ink, reading "Christina M. Cleary". The signature is fluid and cursive, with a long horizontal stroke at the end.

Authorized Pratt & Whitney Representative